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Absorption spectrum of the mixed valence Cr3+-Cr2+ pair center in KZnF3 crystal

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Abstract

Assignment of absorption lines of mixed valence Cr3+-Cr2+ pair center has been done by the analysis of the probabilities of exchange-induced electric-dipole transitions. Parameters of exchange interaction J1 = 44.5 ± 5 cm-1 and axial crystal field B2 0 = -19.6±2 cm-1 for the excited state |Cr2+3Ea; Cr3+4A2□ have been estimated from the fine structure of absorption spectra of the pair. Using microscopic theory of superexchange interaction for the ground and excited states of the pair the value of the transfer integral of eg-electron via the intermediate fluorine ion tvv = 3500 cm-1 has been extracted.

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Keywords

Double exchange, Exchange interaction, Mixed valence, Optical spectroscopy